REMARKS/ARGUMENTS

Claims 1-17 were previously pending in the application. Claims 1, 3, and 11 are amended, and new claim 18 is added herein. Assuming the entry of this amendment, claims 1-18 are now pending in the application. The Applicant hereby requests further examination and reconsideration of the application in view of the foregoing amendments and these remarks.

Objections to the Specification

In page 2 of the Office Action, the Examiner objected to the specification as allegedly failing to provide proper antecedent basis for the claimed subject matter. In particular, the Examiner argued that the specification failed to disclose (1) how to compute a bitwise AND, (2) how to compute an OR, and (3) the idea that the path cost and sharability of any link are independent of one another. Since objections (1) and (3) are related to the 35 U.S.C. §112, first paragraph, rejections of claims 7 and 14, they are addressed below.

Regarding objection (2), the specification at pages 21-22, in conjunction with Fig. 7, discloses computing the OR of all elements of the resulting vector to determine whether sharing is possible. As shown and described, computing the OR in this instance means taking the maximum value of the elements of the vector. Thus, if one or more elements of a binary vector are 1, then the OR of all the elements is 1; otherwise, if all the elements of the vector are 0, then the OR of all the elements is 0.

35 U.S.C. §112 Rejections

In pages 2-4 of the Office Action, the Examiner rejected claims 7 and 14 under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. In page 4 of the Office Action, the Examiner rejected claims 7 and 14 under 35 U.S.C. §112, second paragraph, as being indefinite.

The Examiner argued that Applicant's previously-submitted remarks describing the operation of a bitwise AND were not supported by the specification and that one of ordinary skill in the art would not be able to determine the correct operation. Applicant submits that the computation of a bitwise AND of two vectors **is** well-known in the art, and in support provides, attached hereto, excerpts from two textbooks about computer mathematics. In a voicemail on December 4, 2007, the Examiner indicated that submission of such excerpts would be sufficient

to show that the bitwise AND operation was well-known in the art and that an affidavit from Applicant regarding this matter would not be required. Applicant further submits that it **is** clear what a bitwise AND is and how it is computed.

The first excerpt, submitted concurrently herewith, comprises pages 82-83 of *Discrete Mathematics for Computing*, Second Edition, 2002, by Peter Grossman, which teaches performing a bitwise AND operation on a pair of bitstrings, *A* and *B*. The second excerpt, submitted concurrently herewith, comprises pages 428-430 of *Schaum's Outline of Theory and Problems of Programming with C*, Second Edition, 1996, by Byron Gottfried, which teaches performing a bitwise AND operation on a pair of integers that are manipulated in binary form. Applicant submits that these excerpts show that, at the time of invention, one of ordinary skill in the art would have understood what a bitwise AND operation is and how to perform a bitwise AND operation on two vectors.

The Examiner argued that claim 14 included the added limitation that "the path cost and sharability of a link are independent of one another" and that this limitation is not supported, but is instead contradicted, by the specification. Applicant submits that this argument is based on a misreading of claim 14 since claim 14 does not claim what the Examiner argues. Rather, claim 14 claims something else. Claim 14 depends from claim 1, which recites that the path cost "is a function of sharability of one or more links within the corresponding candidate restoration path." Claim 14 adds the limitation that said path cost "is independent of the sharability of any link within the corresponding candidate primary path."

Thus, claim 14 does not have a limitation that the path cost of a link is independent of the sharability of that same link. Rather, the limitation is that the path cost of a candidate path pair is independent of the sharability of any links within the candidate primary path of the candidate path pair. Previously-submitted claim 14 is further supported by the specification at page 24, lines 27-32, which teaches "that only links that are disjoint to the primary path need to be considered" in computing a path cost. Applicant further submits that it **is** clear what it means for the path cost of a candidate path pair to be independent of the sharability of any link within the candidate primary path of the candidate path pair.

Prior-Art Rejections

In pages 5-9 of the Office Action, the Examiner rejected claims 1-11, 13-15, and 17 under 35 U.S.C. §102(b) as being anticipated by Doshi et al. (U.S. Pat. No. 6,130,875). In pages 9-10, the Examiner rejected claim 12 under 35 U.S.C. §103(a) as unpatentable over Doshi.

Allowable Subject Matter

In page 10 of the Office Action, the Examiner stated that claim 16 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 1 and 11

Claims 1 and 11 have been amended to recite that "the path cost for a candidate path pair is a function of two or more link costs, wherein each link cost is a function of sharability of a different link within the corresponding candidate restoration path," to more clearly distinguish over the cited references. This amendment is supported by Fig. 10 and the specification at page 23, line 19 – page 27, line 17. Claims 1 and 11 have been further amended to recite that "the sharability of the corresponding link corresponds to the ability of the corresponding link to reserve protection bandwidth that is shared between restoration paths of two or more primary paths." This amendment is supported by the specification at page 3, lines 9-14.

In page 11 of the Office Action, the Examiner rejected Applicant's arguments regarding claim 1. The Examiner argued that Doshi's G function teaches determining the capacity available on the links along a route between two nodes, which teaches the sharability of bandwidth along the route. Applicant submits, however, that determining available capacity along a route does **not** indicate weather that capacity is sharable or not. As recited in amended claim 1, the sharability of a link corresponds to the ability of the link to reserve protection bandwidth that is shared between the restoration paths of two or more primary paths. For example, a link with only one bandwidth unit of restoration capacity can be shared among multiple restoration paths, as long as the corresponding primary paths are disjoint.

Even assuming *arguendo* that Doshi's G function teaches generating a result based on sharability, which Applicant does not admit, the G function does not produce a result based on link costs of two or more links in a candidate restoration path, as required by claim 1, but rather

produces a result based, at most, on the characteristics of a single link in a restoration path of a candidate path pair consisting of a primary path and the restoration path.

The calculation of the G(r, λ, s, μ) index for a path pair is described in column 23 of Doshi. As described, the index may be obtained in any one of four different ways, each involving both the primary path and the restoration of a candidate path pair:

> (1) the minimum, across all links on a given pair of routes, of free capacity for selected wavelengths; (2) the index in (1) divided by the total number of links in the two routes; (3) a constant α multiplied by the minimum free capacity on a primary route plus a constant [β] multiplied by the minimum free capacity on a restoration path; or (4) α multiplied by the min[i]mum free capacity on the primary divided by the number of links in the primary, plus [β] multiplied by the minimum free capacity on the restoration divided by the number of links in the restoration.

In each of these four methods, the calculated index value is a function of no more than one single link of the restoration path. In two methods, the index is based on the one narrowest link of a pair of paths. In the other two methods, the index is based on the narrowest link of the primary path and the narrowest link of the restoration path. **None** of the disclosed methods teaches a calculation of a path cost based on link costs of two or more links within the corresponding candidate restoration path, wherein each link cost is a function of the sharability of the corresponding link, as required by claim 1. Thus, it cannot be said that Doshi teaches all the features of claim 1.

Applicant submits therefore that claim 1 is allowable over Doshi. For similar reasons, Applicant submits that claim 11 is also allowable over Doshi. Since claims 2-10 and 14-17 depend variously from claim 1, and claims 12-13 depend from claim 11, it is further submitted that those claims are also allowable over Doshi.

Claim 2

In page 11 of the Office Action, the Examiner rejected Applicant's arguments regarding claim 2. The Examiner argued the algorithm for function G "includes calculating the minimum free capacity along the link and divided [*sic*] that summed value by the number of links along the path to create the individual link costs." Applicant submits that this argument contradicts itself and the cited reference.

The G function includes determining a minimum of free capacity along "a given pair of routes," and not "the link," as the Examiner stated. Furthermore, the minimum of free capacity is **not**, by definition, a sum, but rather the smallest member of a set, and thus, **cannot** be a "summed value," as the Examiner argues. Even assuming *arguendo* that the cited section of Doshi teaches dividing a sum of free capacity values for links along a route by the number of links along the route, which Applicant does not admit, the result would be an average free capacity value and would **not**, as the Examiner argues, "create the individual link costs." Thus, it cannot be said that Doshi teaches all the elements of claim 2.

Applicant submits that this provides further reasons for the allowability of claim 2 over Doshi. Since claims 3-7 and 15-17 depend variously from claim 2, this also provides further reasons for the allowability of those claims over Doshi.

Claim 3

Claim 3 has been amended to more clearly define the term "sharing degree" for a link, wherein sharing degree is the maximum number of additional unit-bandwidth primary services that can be added to the candidate primary path without increasing restoration bandwidth reserved on the link. This amendment is supported by the specification at page 25, lines 1-3.

In page 11 of the Office Action, the Examiner rejected Applicant's arguments regarding claim 3. The Examiner made the same arguments as for claim 1, above, which do not address sharing degree. Applicant submits that Doshi does **not** teach generating a link cost as a function of the sharing degree for a link and then summing those link costs to calculate a path cost, as required by claim 3. Thus, it cannot be said that Doshi teaches all the features of claim 3.

Applicant submits that this provides further reasons for the allowability of claim 3 over Doshi. Since claims 4-7 and 16-17 depend variously from claim 3, this also provides further reasons for the allowability of those claims over Doshi.

Claim 4

The Examiner did not address Applicant's arguments regarding claim 4. Doshi does **not** anywhere teach comparing a link's utilization level to a threshold utilization level, let alone having the result of that comparison determine the generation of the link cost for the link. Thus, it cannot be said that Doshi teaches all of the features of claim 4.

Applicant submits that this provides further reasons for the allowability of claim 4 over Doshi. Since claim 16 depends from claim 4, this also provides further reasons for the allowability of that claim over Doshi.

Claim 7

The Examiner did not address Applicant's arguments regarding claim 7. Neither the cited section nor any part of Doshi teaches, or even mentions, node-link vectors, binary representations of node-link vectors, or bitwise operations of any kind, let alone the particular computations recited in claim 7. Thus, it cannot be said that Doshi teaches all of the features of claim 7.

Applicant submits that this provides further reasons for the allowability of claim 7 over Doshi. Since claim 17 depends from claim 7, this also provides further reasons for the allowability of that claim over Doshi.

Claims 9 and 10

In page 11 of the Office Action, the Examiner rejected Applicant's arguments regarding claims 9 and 10. The Examiner argued that the Doshi algorithm "attempts to find the link that has the highest G value" and that the G value depends on a weighed version of the primary route and restoration route. However, the G value described in the cited sections of Doshi is an index for a primary/restoration path pair, and **not** a link. Therefore, it cannot be said that particular links have a G value.

The Examiner also argued that Doshi teaches the node-link vectors claimed in the application. Aggregate node-link vectors are described in the specification at pages 19-20, and Applicant submits that Doshi does not teach aggregate node-link vectors. Similarly, Applicant submits that Doshi does not teach primary path node-link vectors.

Applicant submits that this provides further reasons for the allowability of claim 9 over Doshi. For similar reasons, Applicant submits that this provides further reasons for the allowability of claim 10 over Doshi.

Claim 14

The Examiner rejected claim 14 based on the alleged teachings in Doshi. The Examiner's rejection of claim 14 relies mostly on the same grounds as the rejection of claim 1. Claim 14 adds to claim 1 the limitation that "the path cost is independent of the sharability of any link within the corresponding candidate primary path." As noted above, in relation to claim 1, the G function disclosed in Doshi teaches calculating an index in one of four possible ways, wherein all of the methods taught are dependent on the candidate primary path. However, as noted, claim 14 requires that the path cost be independent of the sharability of any link within the corresponding candidate primary (but not restoration) path.

Thus, it cannot be said that Doshi teaches all the requisite elements of claim 14. Applicant submits, therefore, that this provides further reasons for the allowability of claim 14 over Doshi.

Claim 17

The Examiner rejected claim 17 based on the alleged teachings in Doshi. In particular, according to the Examiner, Doshi teaches all of the claimed features of claim 1, including a binary representation of a vector having "a plurality of entries corresponding to the nodes and links in the network and each entry of each vector identifies whether failure of the corresponding node or link will cause activation of all the bandwidth that was reserved for restoration paths on the link." The Examiner cited column 14, lines 1-5, of Doshi as specifically teaching this feature. The cited section discloses (1) a list of failures that affect a demand's primary path and (2) a querying of links. It does **not**, however, disclose the binary representation of a vector as described above and as required by claim 17.

Applicant submits that this provides further reasons for the allowability of claim 17 over Doshi.

Claim 18

New claim 18 comprises the subject matter of previously-presented claim 16 rewritten in independent form including all of the limitations of base claim 1 and intervening claims 2, 3, and 4. As noted above, the Examiner indicated that such a claim would be allowable.

Fees

During the pendency of this application, the Commissioner for Patents is hereby authorized to charge payment of any filing fees for presentation of extra claims under 37 CFR 1.16 and any patent application processing fees under 37 CFR 1.17 or credit any overpayment to Mendelsohn & Associates, P.C. Deposit Account No. 50-0782.

The Commissioner for Patents is hereby authorized to treat any concurrent or future reply, requiring a petition for extension of time under 37 CFR § 1.136 for its timely submission, as incorporating a petition for extension of time for the appropriate length of time if not submitted with the reply.

In view of the above amendments and remarks, the Applicant believes that the now pending claims are in condition for allowance. Therefore, the Applicant believes that the entire application is now in condition for allowance, and early and favorable action is respectfully solicited.

Respectfully submitted,

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